CLAIMS

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A welding/plasma power source comprising:

an input stage configured to receive an ac input signal having a period of T seconds and to rectify the ac input signal to provide a rectified intermediate signal having a peak voltage and further wherein the input stage provides a dc voltage signal having a voltage of V volts across a dc bus, wherein V is greater than the peak voltage of the rectified intermediate signal;

an output stage disposed to receive the dc voltage signal and configured to provide an available output power signal having a power of P watts; and

a bus capacitor connected across the dc bus wherein the bus capacitor has a capacitance of at least $(3PT)/(V^2)$ farads.

2. The welding/plasma power source of claim 1 wherein the capacitance is at least $(4PT)/(V^2)$.

3. The welding/plasma power source of claim 1 wherein the capacitance is at least $(5PT)/(V^2)$.

4. The welding/plasma power source of claim 1 wherein the input stage includes an input rectifier configured to receive the ac input signal.

5. The welding/plasma power source of claim 4 wherein the input stage further includes a converter configured to provide the dc voltage signal.

6. The welding/plasma power source of claim 5 wherein the converter is a boost converter.

7. The welding/plasma power source of claim 5 wherein the converter is a buck converter.

8. The welding/plasma power source of claim 1 wherein the input stage includes a converter configured to provide the dc voltage signal.

9. The welding/plasma power source of claim 1 wherein the output stage includes an inverter disposed to receive the dc voltage signal.

10. The welding/plasma power source of claim 9 wherein the inverter is a pulse width modulating inverter.

11. The welding/plasma power source of claim 9 wherein the output stage further includes an output transformer configured to provide the available output power signal.

12. The welding/plasma power source of claim 9 wherein the output stage further includes an output rectifier configured to provide the available output power signal.

13. The welding/plasma power source of claim 1 wherein the output stage includes an output rectifier configured to provide the available output power signal.

14. A welding/plasma power source comprising:

an input stage configured to receive an ac input signal having a period of T seconds and to rectify the ac input signal to provide a rectified intermediate signal having a peak voltage and further wherein the input stage provides a dc voltage signal having a voltage of V volts across a dc bus, wherein V is greater than the peak voltage of the rectified intermediate signal;

an output stage disposed to receive the dc voltage signal and configured to provide an available output power signal having a power of P watts; and

an energy storage device connected to provide stored energy to the dc bus, wherein the energy storage device can store energy of at least (1.5)(PT) joules.

15. The welding/plasma power source of claim 14 wherein the energy storage device can store energy of at least (2)(PT) joules.

16. The welding/plasma power source of claim 14 wherein the energy storage device can store energy of at least (2.5)(PT) joules.

17. A welding/plasma power source comprising:

an input stage configured to receive an ac input signal and to rectify the ac input signal to provide a rectified intermediate signal having a peak voltage and further wherein the input stage provides a dc voltage

signal having a voltage of V volts across a dc bus, wherein V is greater than the peak voltage of the rectified intermediate signal;

an output stage disposed to receive the dc voltage signal and configured to provide an available output power signal; and

a bus capacitor connected across the dc bus wherein the bus capacitor has a capacitance of at least 438 microfarads.

18. The welding/plasma power source of claim 17 wherein the capacitance is at least 500 microfarads.

19. The welding/plasma power source of claim 17 wherein the capacitance is at least 583 microfarads.

20. The welding/plasma power source of claim 17 wherein the capacitance is at least 729 microfarads.

21. A welding/plasma power source comprising:

an input stage configured to receive an ac input signal from a utility source and a generator source and further wherein the input stage provides a dc bus signal;

an output stage disposed to receive the dc bus signal and configured to provide an available output power wherein the available output power has a first value when the ac input signal is from the utility source and a second value when the ac input signal is from the generator source and further wherein the second value is at least seventy-five percent of the first value.

22. The welding/plasma power source of claim 21 wherein the second value is at least ninety percent of the first value.

23. The welding/plasma power source of claim 21 wherein the second value is at least ninety-five percent of the first value.

24. A welding/plasma power source comprising:

an input stage configured to receive an ac input signal and to rectify the ac input signal to provide a rectified intermediate signal having a peak voltage and further wherein the input stage provides a dc voltage signal having a voltage of V volts across a dc bus, wherein V is greater than the peak voltage of the rectified intermediate signal;

an output stage disposed to receive the dc voltage signal and configured to provide an available output power signal; and

an energy storage device connected to provide stored energy to the dc bus, wherein the energy storage device can store sufficient energy to maintain the available output power signal through the duration of mechanical transients.

25. A welding/plasma power source comprising:

a generator source configured to provide an ac input signal wherein the ac input signal includes at least one mechanical transient;

an input stage configured to receive the ac input signal from the generator source and to rectify the ac input signal to provide a rectified intermediate signal having a peak voltage and further wherein the input

stage provides a dc voltage signal having a voltage of V volts across a dc bus, wherein V is greater than the peak voltage of the rectified intermediate signal;

an output stage disposed to receive the dc voltage signal and configured to provide an available output power signal; and

an energy storage device connected to provide stored energy to the dc bus, wherein the energy storage device can store sufficient energy to maintain the available output power signal through the duration of the at least one mechanical transient.

26. A method of providing welding/plasma power comprising:

receiving an ac input signal having a period of T seconds;

rectifying the ac input signal to provide a rectified intermediate signal having a peak voltage;

providing a dc voltage signal having a voltage of V volts across a dc bus, wherein V is greater than the peak voltage of the rectified intermediate signal;

receiving the dc voltage signal;

providing an available output power signal having a power of P watts; and

providing a capacitance of at least $(3PT)/(V^2)$ farads across the dc bus.

27. The method of claim 26 wherein the capacitance is at least $(4PT)/(V^2)$.

28. The method of claim 26 wherein the capacitance is at least $(5PT)/(V^2)$.

29. A method of providing welding/plasma power comprising:

receiving an ac input signal having a period of T seconds;

rectifying the ac input signal to provide a rectified intermediate signal having a peak voltage;

providing a dc voltage signal having a voltage of V volts across a dc bus, wherein V is greater than the peak voltage of the rectified intermediate signal;

receiving the dc voltage signal;

providing an available output power signal having a power of P watts; and

providing stored energy to the dc bus from an energy storage device capable of storing at least (1.5)(PT) joules of energy.

30. The method of claim 29 wherein the energy storage device can store energy of at least (2)(PT) joules.

31. The method of claim 29 wherein the energy storage device can store energy of at least (2.5)(PT) joules.

32. A method of providing welding/plasma power comprising:

receiving an ac input signal;

rectifying the ac input signal to provide a rectified intermediate signal having a peak voltage;

providing a dc voltage signal having a voltage of V volts across a dc bus, wherein V is greater than the peak voltage of the rectified intermediate signal;

receiving the dc voltage signal;

providing an available output power signal; and

providing capacitance of at least 438 microfarads across the dc bus.

33. The method of claim 32 wherein the capacitance is at least 500 microfarads.

34. The method of claim 32 wherein the capacitance is at least 583 microfarads.

35. The method of claim 32 wherein the capacitance is at least 729 microfarads.

36. A method of providing welding/plasma power comprising:

receiving an ac input signal from at least one of a utility source and a generator source;

providing a dc bus signal;

receiving the dc bus signal;

providing an available output power wherein the available output power has a first value when the ac input signal is from the utility source and a second value when the ac input signal is from the generator source and further wherein the second value is at least seventy-five percent of the first value.

37. The method of claim 36 wherein the second value is at least ninety percent of the first value.

38. The method of claim 36 wherein the second value is at least ninety-five percent of the first value.

39. A method of providing welding/plasma power comprising:

receiving an ac input signal;

rectifying the ac input signal to provide a rectified intermediate signal having a peak voltage;

providing a dc voltage signal having a voltage of V volts across a dc bus, wherein V is greater than the peak voltage of the rectified intermediate signal;

receiving the dc voltage signal;

providing an available output power signal; and

providing stored energy to the dc bus from an energy storage device capable of storing sufficient energy to maintain the available output power signal through the duration of mechanical transients.

40. A method of providing welding/plasma power comprising:

providing an ac input signal from a generator source wherein the ac input signal includes at least one mechanical transient;

receiving the ac input signal;

rectifying the ac input signal to provide a rectified intermediate signal having a peak voltage;

providing a dc voltage signal having a voltage of V volts across a dc bus, wherein V is greater than the peak voltage of the rectified intermediate signal;

receiving the dc voltage signal;

providing an available output power signal; and

providing stored energy to the dc bus from an energy storage device capable of storing sufficient energy to maintain the available output power signal through the duration of the at least one mechanical transient.